# The MINDS Lab Research Initiatives

**Multi-disciplinary Initiatives in Naturalistic Decision Systems**

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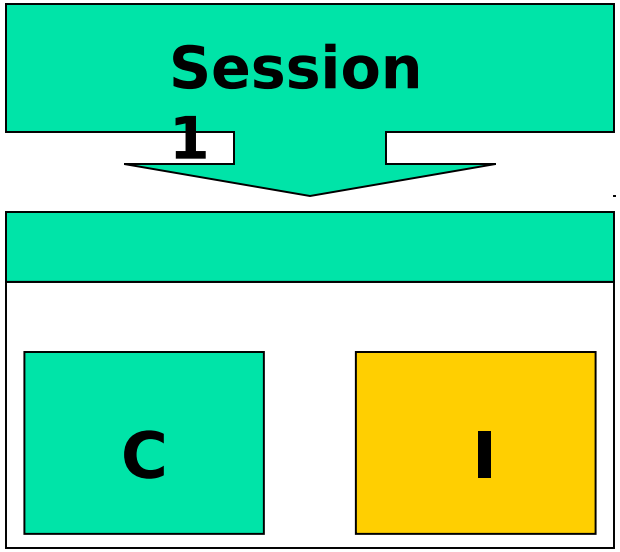
# Past Research…

- **McNeese (2000) Cognition, Technology, & Work**
  - Cooperative Learning Groups Vs. Individual Learning Conditions
  - Research Questions:
    - Are groups better than individuals at solving complex problems?
    - How do cooperative and individual learning processes affect transfer to similar problems?
    - What circumstances make cooperative learning valuable?
  - Four Types of Measures:
    - Problems space measures
    - Statement type measures
    - Performance measures
    - Recall/recognition measures

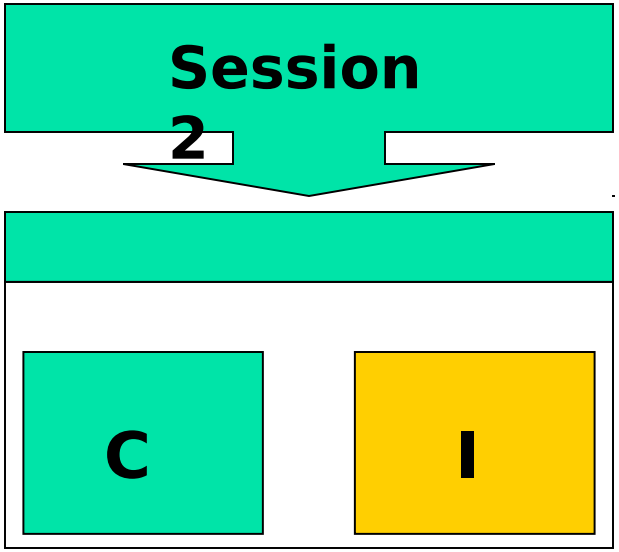
# JASPER/REPSAJ Tasks…

- Simple tasks, requires no pre-training.
- JASPER: Computer-controlled, video-anchored environment presenting an ill-defined story problem.
- REPSAJ: Textual analogue to JASPER
- REPSAJ following JASPER presents situation for near-term knowledge transfer.

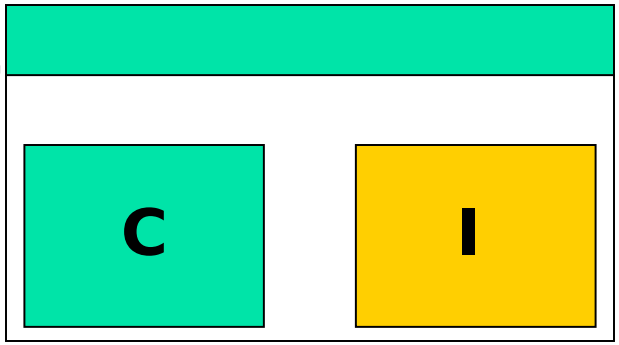
# Experimental Design (McNeese 2000)




Stage 1




Stage 3




Stage 2

*Only individuals tested

# Past Research (continued)...

- **Main Findings**
  - Groups solved more elements of the JASPER problem as measured by their overall score in problem space analysis.
  - Individuals transferred more information to the knowledge task (REPSAJ).
  - Individuals appeared transfer more “knowledge” than individuals who worked in groups during the KAP. However, those individuals solved more of the complex parts of the REPSAJ problem.

# Past Research Conclusions & Implications…

- Cognitive benefits accrue when people work together (e.g., collective induction & generative learning).
- While group metacognitive activities may improved complex problem-solving, distributed work may lead to dependency & potentially deficiency.
- When group size increases, collective induction ability may increase as the amount of distributed knowledge increases.

# More Recent Research…

- **“The Role of Distributed Computer-Supported Cooperative Learning in the Acquisition and Transfer of Knowledge” (2002 HFES Conference)**

- **Hypotheses:**
  - When individuals examine JASPER before they work in groups, the amount of detail transfer they exhibit will improve.
  - Increasing group size will improve the quality of group metacognitive strategies, thereby improving the quality of their solutions in the transfer task.

- Conditions:
  - Unanchored Condition (Control, no acquisition task)
  - Individual Condition (Both acquisition & transfer task)
  - Group Condition (Both acquisition & transfer task)
  - Enhanced Condition (Acquisition(I)/Acquisition(G)/Transfer)

# More Recent Research (continued)…

- Measures:
  - Problem Space, Performance, & recall measures

- Main Findings:
  - No significant cultural differences were shown.
  - The “Enhanced condition” was not found to lead to improved transfer.
  - Perceptual anchoring did not lead to formation of shared mental models for spatially distributed groups.
  - Spatially distributed groups still transfer less than individuals.
  - All groups performed highly vigilant error monitoring in both the knowledge acquisition phase and transfer task.

# More Recent Research Conclusions & Implications…

- No demographic or socio-cultural differences due to poor population sample.
- Lack of social cues may have negatively impacted the quality of decision-making and knowledge transfer for the “enhanced group”.
- Metacognitive strategies could increase quality of knowledge transfer by parsing out bad or irrelevant information.

# MINDS Lab Research Initiatives

## Electronic Communications Technologies

- Basic/Current Level:
  - Chatrooms
- Next Step:
  - New Collaborative Technology
- Group Members:
  - Eric Shaw
  - Rashaad Jones
  - Tyrone Jefferson

# MINDS Lab Research Initiatives
(continued)

## Experimental Task Development

- Basic/Current Level:
  - JASPER / REPSAJ
- Next Step:
  - Development of a new Collective Knowledge Management Task
- Group Members:
  - Rashaad Jones
  - Tyrone Jefferson
  - Eric Shaw

# New Collective Knowledge Management Task

- Need to develop a complex task.
  - More operationally relevant, allows for extrapolation
  - May require training and has potential training effects.
- Example: C.I.T.I.E.S. Model (by Rod Wellens); EMS Management in a synthetic task environment.
- “Opportunities for jointness”

# MINDS Lab Research Initiatives
(continued)

## Socio-Cultural Variables

- Basic/Current Level:
  - Ethnic Diversity Factors
- Next Step:
  - Socio-Cultural Variables
- Group Members:
  - Ivanna Terrell
  - Danita Hill
  - Lori Ferzandi

# MINDS Lab Research Initiatives
(continued)

## Task Interface Design

- Basic/Current Level:
  - Perceptual Interface
- Next Step:
  - Intelligent Interface / Intelligent Tools
- Group Members:
  - Danita Hill
  - Ivanna Terrell
  - Lori Ferzandi
  - Undergraduate assts.

# Future Research…

- Examining the Role of Unshared Information in Distributed Computer-Supported Cooperative Learning in the Acquisition and Transfer of Knowledge (early 2003)
  - Hidden Profiles of Information
  - Investigators: Lori Ferzandi & Tyrone Jefferson
- Interface Agent Development (Dr. Steven Haynes)

# Knowledge Acquisition & Transfer References…


- McNeese, M.D. (2000). Socio-cognitive factors in the acquisition and transfer of knowledge. *Cognition, Technology, & Work, 2,* 164-177.

- McNeese, M.D., Salas, E., Endsley, M.R. (2001). *New trends in cooperative activities: Understanding systems dynamics in complex environments.* Human Factors and Ergonomics Society: Santa Monica, CA

# Hidden Profiles References…


- Stasser, G. (1992). Information salience and the discovery of hidden profiles by decision-making groups: A “thought experiment”. *Organizational Behavior and Human Decision Processes, 52,* 156-181.

- Stasser, G., Vaughan, S.I., & Stewart, D.D. (2000). Pooling unshared information: The benefits of knowing how access to information is distributed among groups members. *Organizational Behavior and Human Decision Processes, 82(1),* 102-116.

- Stewart, D.D., & Stasser, G. (1998). The sampling of critical, unshared information in decision-making groups: The role of an informed minority. *European Journal of Social Psychology, 28,* 95-113.